



SAINIK SCHOOL BHUBANESWAR

SUMMER VACATION TASK 2020 – 21 (CLASS XI)

BIOLOGY

1. Prepare an investigatory project report from any one of the above mentioned topics and also prepare herbarium sheets of any five locally available plants:-
 - (a) Secondary metabolites in plants
 - (b) Role of plant growth regulators
 - (c) Morphological character: flower inflorescence and leaves in
 - (d) angiosperm
 - (e) Secondary growth in dicot stem
 - (f) Types of animal tissues



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CHEMISTRY

Answer the following questions.

1. Draw the modern periodic table of elements on a chart paper.
2. Write the names, symbols, electronic distributions, valencies of elements having atomic no 1 to 30.
3. Make a list of cations and anions (including polyatomic ions) with their formulas and valencies. By using the list write the names and formulas of 100 ionic compounds.
4. An element 'Y' belongs to the third period and group 15 of the periodic table. Find out the following:-
 - (a) the number of valence electrons in its atom.
 - (b) is it a metal or non-metal?
 - (c) name of the element and its electronic configuration.
5. An element 'X' belongs to the fourth period and group 1 of the periodic table. Find out the following:-
 - (a) the number of valence electrons in its atom.
 - (b) is it a metal or non-metal?
 - (c) name of the element and its electronic configuration.
6. The first ionization enthalpy values (in KJ/mol) of group 13 elements are

B	Al	Ga	In	Tl
801	577	579	558	589

 - (a) How would you explain this deviation from the general trend?
 - (b) How would you explain the fact that the first ionization enthalpy of sodium is lower than that of magnesium but its second ionization enthalpy is higher than that of magnesium?
7. What is the effect of temperature on:
 - (a) density
 - (b) surface tension
 - (c) viscosity
 - (d) vapour pressure of a liquid.
8. What is the effect of pressure on the following?
 - (a) volume
 - (b) boiling point
 - (c) viscosity of a liquid

9. Explain the following:-
- (a) The boiling point of a liquid rises on increasing pressure.
 - (b) Drops of liquids assume spherical shape.
 - (c) The boiling point of water (373 K) is abnormally high when compared to that of hydrogen sulphide (211.2 K).
 - (d) The level of mercury in a capillary tube is lower than the level outside when a capillary tube is inserted into the mercury.
 - (e) Liquids like ether and acetone are kept in cool places.
 - (f) Tea or coffee is sipped from a saucer when it is quite hot.
10. Draw the Lewis structures for the following molecules and ions:-
 H_2S , SiCl_4 , BeF_2 , CO_3^{-2} , HCOOH
11. Define Octet rule. Write its significance and limitations.



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ENGLISH

ASSIGNMENT NO. 01 (NOTICE)

1. You are an NCC Officer of K.V. Mysore. You have decided to send a troop of NCC of your school to the National Integration Camp to be held at Lucknow for a week. Draft a notice in not more than 50 words to be placed on the school notice board inviting the names of those Cadets who are interested to participate in the Camp. Invent the necessary details.
2. Due to a sudden landslide and unfavourable weather, Navodaya Vidyalaya Shimla has to be closed for a week. As the Principal of that school, draft a notice in not more than 50 words to be displayed at the school main gate notice board.
3. You are Secretary of Lions Club, Madurai. Write a notice in not more than 50 words informing the members to attend an extraordinary meeting of the governing body. Include details like date, time venue, etc.
4. You are Srinivas / Nidhi of D.P. Public School, Nagpur. As a student Editor of your school magazine, draft a notice in not more than 50 words for your school notice board inviting articles / reports from the students of all classes.
5. You are Rohit / Ritu, Secretary, Welfare Association, ABC Colony, Chennai, Write a notice in not more than 50 words to be placed on the notice board informing the residents that there would be no water supply for two days in your colony due to major pipeline repair work.

ASSIGNMENT NO. 02 (ADVERTISEMENT)

1. You are Harish of No. 10, Kailash Ganj and Patna. Draft an advertisement to be published in the daily. 'The Hindustan Times', under classified columns to dispose off your car as you are going abroad.
2. You have recently started a Centre for Personality Development for school children. Draft an advertisement to be published in a local daily about it, giving all relevant details.
3. You are Manisha. You have started hobby classes for children of 6 to 12 years. Prepare a suitable advertisement giving all the required details. (50 words)
4. You are Mohan of Raja ki Mandi, Agra. You want a dance teacher for your younger sister. Write an advertisement to be published in the classified columns of a local daily.
5. You propose to sell your flat as you are going abroad. Draft an advertisement to be published in the classified columns of 'The Times of India', New Delhi. Invent necessary details.

ASSIGNMENT NO. 03 (POSTER)

1. Recent rains have caused havoc in some parts of our country. You are Surya, a member of the social service organization, Seva Ashram, Bangalore. Draft a poster requesting people to help the rain and flood affected families physically and economically.
2. A 'Check Vehicular Pollution' campaign is being organised in your city. Draft a poster to be used in the campaign.
3. Water is precious and each one of us must stop wastage. Prepare a poster in not more than 50 words, for creating that awareness.
4. Draft a poster announcing a 'Book Week' being organized by the Cultural Society, Ahmadabad.
5. Your school is planning a campaign in support of eye donation to mobilise the students and society. Design a poster to be displayed in different areas of the locality surrounding your school highlighting the need for eye donation and eye banks.

ASSIGNMENT NO. 04 (LETTER)

1. You are Manas/ Manasi at the Press Apartments of Sunder Nagar, Bhilai. The main road leading to this colony has three man holes causing frequent accidents at night. There are no street lights on the main road. Write a letter to the Editor of the Times of India drawing attention of the government to this problem of the residents.
2. Write a letter to the Editor of a national daily inviting the attention of the authorities towards the increasing environmental pollution in your city.
3. You are Vishal / Veena, a student of class XI, Green Park, New Delhi and interested in learning languages. You come across an advertisement in The Times of India issued by The Institute of Foreign languages, New Delhi about the certificate course in English offered by them. Write a letter to the Director of the Institute seeking more information about the course duration, study hours, fee structure, etc.
4. You are Mr R Mohanty, PGT Chemistry, Cambridge High School, Puri. you had placed an order with Messrs. Scientific Equipments, Dadar, Mumbai for test tubes and jar for the lab. When the parcel was received you observed that markings on the test tubes were not clear and some of the jars were damaged. Write a letter of complaint seeking immediate replacement.
5. You are the Manager of Fitness Club of Gandhi Road, Balasore. Write a letter to Pioneer Sports Co., Balasore, placing an order for a minimum of 4 fitness equipments.

ASSIGNMENT NO. 05 (ARTICLE)

1. Write an article in about 150-200 words for your school magazine on 'Films and their influence on school-going children'. You are Manpreeth / Manjula, a student of class XI.
2. You are Rohit / Kamal. You attended a seminar on Yoga, a way of life. Write an article in about 150-200 words on the contribution of yoga in leading a healthy and peaceful life.
3. Recently you visited your ancestral home in a village in Gujarat. You were elated and strongly felt the necessity to hold on to the roots of our modern life, which lie in our villages. Write an article for your school magazine. You are Chetna / Chirag, Cultural Secretary of your school.
4. With rising number of people in almost all the big cities of the country, the rate of crime has also increased proportionately. The police needs to be trained in new methodology of combating the crime besides changing the mindset. Write an article in 150-200 words on the role of police in maintaining law and order in the metropolitan cities. You are Ravi/ Ravina.
5. The invention of mobile phone can be a blessing, but if misused it can prove to be a curse. Write an article in about 150-200 words on this invention. You are Karthik / Karishma.

ASSIGNMENT NO. 06 (DEBATE)

1. You are Sameer/Saira. Write debates both for and against the motion. 'Entrance tests are the right method for selecting student for undergraduate courses'. 150-200 words.
2. In an inter school debate competition, you have to speak on the motion, "Safety of women working in night shifts is inadequate". You have to speak for the motion. Draft a debate in 150-200 words.
3. Draft a debate against the motion "The government is not protecting primary school children for contamination of midday meals given in schools." 150-200 words.
4. Your school is organizing an inter house debate competition on the topic "National security cannot be considered as an excuse for damaging the environment." Write your views in favour of or against the motion in about 150-200 words.
5. Write your opinion in the form of a debate on the topic "Corporal punishment in school promotes well disciplined students". Your answer should be in about 150-200 words.

ASSIGNMENT NO. 07 (SPEECH)

1. Water is very precious. Some scientists even go to the extent of saying that the Third World War may be fought on the issue of water. Write a speech in 150-200 words expressing your views to be delivered in the morning assembly in your school.
2. "To use the latest technology the right way, is in the hands of the youth today." Write a speech in 150-200 words discouraging the misuse of technological products like cell phones, computers etc and highlighting the need to use them to promote harmony and goodwill in the society.
3. "Our Good Earth", an environmental awareness magazine has launched a marathon 'Clean Your City' campaign. As an active participant write a speech to be read out in the morning assembly urging students to participate in the campaign in 150-200 words.
4. As a concerned citizen, you are worried about the harmful effects of the insanitary conditions in your town. Write a speech on the necessity of sanitation, to be given at the morning assembly in your school in 150-200 words.
5. You are Raj / Rani, the Head Boy/Head Girl of DM Public School, Patna. You have to deliver a speech in your school assembly on the 'World Peace Day' on the topic, 'Let's Practice Non-Violence'. Write the speech in 150-200 words pointing out the recent acts of terrorism that claimed innocent lives, and highlighting the value of non-violence which is the need of the hour.



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COMPUTER SCIENCE

1. What is an IP address?
2. What is social networking?
3. Write down names of any three social networking sites.
4. What are the merits of social networking?
5. What are the demerits of social networking?
6. What is cyber trolling?
7. Write down the medium of trolling.
8. What is cyber stalking?
9. Name three data security concept.
10. What is personal information?
11. What is information technology security?
12. What do you mean by hacker?
13. What is social media?
14. Why do people troll?
15. What is the purpose of web browser?
16. What is the role of firewall?
17. What do you mean by cybercrime?
18. What is the difference between Spyware and Adware?
19. Define digital footprint.
20. What do you mean by malware?



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MATHEMATICS

TOPIC : PRE-REQUISITE MATHS

Number Theory

1. The set of natural numbers, $N = \{1, 2, 3, \dots\}$
2. The set of whole numbers, $W = \{0, 1, 2, 3, \dots\}$
3. The set of integers, $Z = \{\dots, -2, -1, 0, 1, 2, \dots\}$
4. The set of positive integers, $Z^+ = \{1, 2, 3, \dots\}$
5. The set of negative integers, $Z^- = \{-1, -2, -3, \dots\}$
6. The set of rational numbers, $Q = \{a/b, a, b \in Z, b \neq 0\}$. The fraction a/b when expressed in decimal form is either terminating or non terminating but repeating (recurring) decimal.
7. An irrational number is a number which cannot be expressed in the form a/b , where a, b are integers and $b \neq 0$. In decimal form they are non terminating as well as non recurring.
8. The set of real numbers $R = \{x : x^2 \geq 0\}$. R is the set of rational and irrational numbers. So Irrational numbers set can be represented as $R - Q$. Any decimal number is real and vice versa.
9. The complete set of rational and irrational numbers is the set of real numbers and is denoted by R .
10. Real numbers can be represented as points of a line. This line is called as real line or number line.
11. All the real numbers follow the order property; i.e. if there are two distinct real numbers a and b then either $a < b$ or $a > b$.

NOTE:

- (a) Integers are rational numbers, but converse need not be true.
- (b) Negative of an irrational number is an irrational number.
- (c) Sum of a rational number and an irrational number is always an irrational number e.g. $2 + 3$.
- (d) The product of a non zero rational number & an irrational number will always be an irrational number.
- (e) If $a \in Q$ and $b \in Q$, then $ab =$ rational number, only if $a = 0$.
- (f) Sum, difference, product and quotient of two irrational numbers need not be an irrational number (it may be a rational number also).

Properties of Number system

Closure: **W** (addition , multiplication), **N** (addition , multiplication), **Z** (addition, subtraction, multiplication), **Q** (addition , subtraction, multiplication, division in $\mathbf{Q} - \{0\}$), **R** (addition , subtraction, multiplication, division in $\mathbf{R} - \{0\}$).

Associative: **W** (addition , multiplication), **N** (addition , multiplication), **Z** (addition, multiplication), **Q** (addition , multiplication), **R** (addition , multiplication).

Commutative: **W** (addition , multiplication), **N** (addition , multiplication), **Z** (addition, multiplication), **Q** (addition , multiplication), **R** (addition , multiplication).

Existence of Identity:

Additive identity- $W = 0$, $N =$ does not exist, $Z = 0$, $Q = 0$, $R = 0$.

Multiplicative identity- $W, N, Z, Q, R =$ all 1.

Existence of Inverse:

Additive inverse- $W, N =$ does not exist, $Z, Q, R =$ - given number.

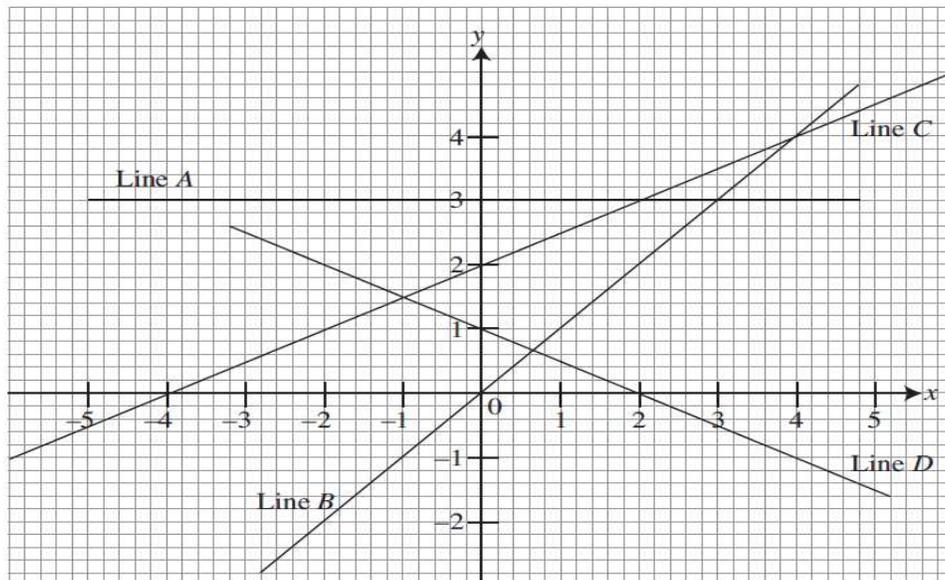
Multiplicative identity- $W, N, Z =$ does not exist, $Q, R = \frac{1}{\text{given number except zero}}$.

Functions and Graphs

Linear Graphs

- The equation of a straight line is given by $y = mx + c$, where $m =$ gradient of the straight line and $c =$ y -intercept.
- The gradient of the line (usually represented by m) is given as $m =$ vertical change / horizontal change.

Find the m (gradient), c (y -intercept) and equations of the following lines.



For Line A:

The line cuts the y -axis at $y = 3$. $\therefore c = 3$.

Since Line A is a horizontal line,
the vertical change = 0.

$$\therefore m = 0.$$

For Line B:

The line cuts the y -axis at $y = 0$. $\therefore c = 0$.

Vertical change = 1, horizontal change = 1.

$$\therefore m = 1/1 = 1$$

For Line C:

The line cuts the y -axis at $y = 2$. $\therefore c = 2$.

Vertical change = 2, horizontal change = 4.

$$\therefore m = 2/4 = 1/2$$

For Line D:

The line cuts the y -axis at $y = 1$. $\therefore c = 1$.

Vertical change = 1, horizontal change = -2.

$$\therefore m = 1 / -2 = -1/2.$$

Line	m	c	Equation
A	0	3	$y = 3$
B	1	0	$y = x$
C	$\frac{1}{2}$	2	$y = \frac{1}{2}x + 2$
D	$-\frac{1}{2}$	1	$y = -\frac{1}{2}x + 1$

TOPIC: LOGARITHM**Introduction**

1. It is very lengthy and time consuming to find the value of $\sqrt{0.0000165}$, or finding number of digits in 3^{12} , 2^8 . John Napier (1550-1617 AD) invented logarithm (in 1614 AD) to solve such problems. The word "Logarithm" was formed by two Greek words, 'logos' which means 'ratio', and 'arithmos' meaning 'number'. Henry Briggs (1556-1630 AD) introduced common logarithm. He published logarithm in 1624 AD. In its simplest form, a logarithm answers the question, "How many of one number do we multiply to get another number?"

2. How many 2s do we multiply to get 8? $2 \times 2 \times 2 = 8$, So we needed to multiply 3 of the 2s to get 8. So the logarithm of 8 to the base 2, written as $\log_2 8$ is 3.

3. The logarithm of the number N to the base 'a' is the exponent indicating the power to which the base 'a' must be raised to obtain the number N.

This number is designated as $\log_b N$.

Hence $\log_a N = x \iff a^x = N$, $a > 0$, $a \neq 1$ & $N > 0$

If $a = 10$, then we write $\log b$ rather than $\log_{10} b$

If $a = e$, we write $\ln b$ rather than $\log_e b$

The existence and uniqueness of the number $\log_a N$ follows from the properties of an exponential functions.

4. From the definition of the logarithm of the number N to the base 'a', we have an identity: $a^{\log_a N} = N$, $a > 0$, $a \neq 1$ & $N > 0$
This is known as the FUNDAMENTAL LOGARITHMIC IDENTITY.

Remark: $\log_a 1 = 0$ ($a > 0$, $a \neq 1$), $\log_a a = 1$ ($a > 0$, $a \neq 1$), $\log_{1/a} a = -1$ ($a > 0$, $a \neq 1$).

Remember: $\log_{10} 2 = 0.3010$, $\log_{10} 3 = 0.4771$, $\ln 2 = 0.693$, $\ln 10 = 2.303$.

5. The principal properties of logarithms:

Let M & N are arbitrary positive numbers, $a > 0$, $a \neq 1$, $b > 0$, $b \neq 1$ and a is any real number then

$$(i) \log_a M.N = \log_a M + \log_a N \quad (ii) \log_a \frac{M}{N} = \log_a M - \log_a N \quad (iii) \log_a M^B = B.\log_a M$$

$$(iv) \log_{a^b} m = \frac{1}{b} \log_a m. \quad (v) \frac{\log_a m}{\log_a n} = \log_n m \text{ (base change theorem).}$$

Remark : $\log_b a.\log_a b = 1 \Leftrightarrow \log_b a = \frac{1}{\log_a b}$.
 $\log_b a.\log_c b.\log_a c = 1$
 $\log_y x.\log_z y.\log_a z = \log_a x$.

6. Logarithmic equations:

$$\log_a x = \log_a y \text{ possible iff } x = y \text{ i.e. } \log_a x = \log_a y \Leftrightarrow x = y$$

Always check the validity of the given equation i.e. $x > 0$, $y > 0$, $a > 0$, $a \neq 1$

7. Common and natural logarithm:

$\log_{10} N$ is referred as a common logarithm and $\log_e N$ is called as natural logarithm of N to the base Napierian and is popularly written as $\ln N$. Note that e is an irrational quantity lying between 2.7 to 2.8 .

Note that $e^{\ln x} = x$.

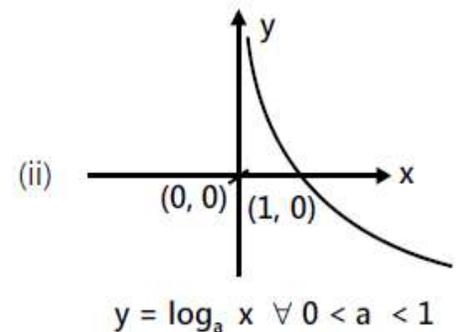
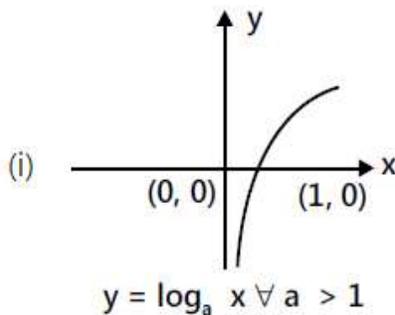
8. Characteristic & Mantissa:

(a) The common logarithm of a number consists of two parts, integral and fractional, of which the integral part may be zero or an integer (+ve or -ve) and the fractional part of decimal, less than one and always positive.

(b) The integral part is called the characteristic and the decimal part is called the mantissa. It should be noted that, if the characteristic of the logarithm of N is p then number of significant digit in $N = p + 1$, if p is the non negative characteristic of $\log N$. Number of zeros after decimal before a significant figure start is $p - 1$.

NOTE

- (a) If the number & the base are on one side of the unity, then the logarithm is positive; If the number and the base are on different sides of unity, then the logarithm is negative.
- (b) The base of the logarithm 'a' must not equal unity otherwise numbers not equal to unity will not have a logarithm & any number will be the logarithm of unity. The mantissa part of the log of a number is always kept non-negative, it ranges from $[0, 1]$
- (c) If the characteristic of $\log_{10}N$ is C then the number of digits in N is $(C + 1)$.

9. Graph of Logarithmic Function:

If the number and the base are on the same side of unity, then the logarithm is positive, and if the number and the base are on different side of unity then the logarithm is negative.

Illustration: Which of the following numbers are positive/negative?

- (a) $\log_2 7$ (b) $\log_{1/2} 3$ (c) $\log_{1/3} (1/5)$ (d) $\log_4 3$ (e) $\log_2 9$

Sol: By observing whether the Number and Base are on the same side of unity or not we can say whether the numbers are positive or negative.

- (a) Let $\log_2 7 = x$ (number and base are on the same side of unity) $\Rightarrow x > 0$
- (b) Let $\log_{1/2} 3 = x$ (number and base are on the same side of unity) $\Rightarrow x < 0$
- (c) Let $\log_{1/3} (1/5) = x$ (number and base are on the same side of unity) $\Rightarrow x > 0$
- (d) Let $\log_4 3 = x$ (number and base are on the same side of unity) $\Rightarrow x > 0$
- (e) Let $(\log_2 9) = x$ (number and base are on the same side of unity) $\Rightarrow x > 0$

ASSIGNMENT

1. Solve:-

- (a) $\log_{16} 32$ (b) $\log_8 16$ (c) $\log_{1/3} 1/9$ (d) $\log_{2\sqrt{3}} 1728$
(e) $\log_2 \cos 45^\circ$ (f) $\log_2 \log_2 4$ (g) $\log_3 \tan 30^\circ$.

2. Prove the following:-

- (a) $\log_5 \sqrt{5 \sqrt{5 \sqrt{5} \dots \dots \infty}} = 1$
(b) $\log_{0.125} 8 = -1$
(c) $\log_{1.5} 0.6 = -1$.

3. Find the no. of digits in

- (a) 2^{100} (b) 3^{10}

4. Draw the graphs of $\log_e x$ and $2^x, e^x, 3^x$ in graph paper.



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SUMMER VACATION TASK 2020 – 21 (CLASS XI)

PHYSICS

1. Prepare investigatory project reports from any THREE of the following topics:-
 - (a) Verification of Hooke's law.
 - (b) Capillary rise and capillary fall.
 - (c) Bernoulli's principle and it's applications.
 - (d) Which is easier - pushing or pulling
 - (e) Law of conservation of energy
 - (f) Simple harmonic oscillation and varieties of example relating to it.
 - (g) How acceleration due to gravity varies with increasing height and depth from the surface of Earth.
 - (h) Geostationary satellite and polar satellite.